

What Is Claimed Is:

1. A method of reducing combustion chamber deposit flaking in spark ignited internal combustion engines that experience combustion chamber deposits comprising the steps of:

supplying a fuel comprising an additive that includes a metal-containing compound to a spark ignited internal combustion engine,

wherein the metal-containing compound is supplied in an amount effective to reduce combustion chamber deposit flaking.

2. A method as described in claim 1, wherein the metal-containing compound comprises a metal selected from the group consisting of manganese, platinum, palladium, rhodium, iron, cerium, copper, nickel, silver, cobalt, and molybdenum, and mixtures thereof.

3. A method as described in claim 2, wherein the metal-containing compound comprises a manganese-containing compound.

4. The method described in claim 3, wherein the manganese-containing compound is an inorganic manganese compound.

5. The method described in claim 4, wherein the inorganic manganese compound is selected from the group consisting of fluorides, chlorides, bromides, iodides, oxides, nitrates, sulfates, phosphates, nitrides, hydrides, hydroxides, carbonates and mixtures thereof.

6. The method described in claim 3, wherein the manganese-containing compound is an organometallic compound.

7. The method described in claim 6, wherein the organometallic compound is selected from the group consisting of alcohols, aldehydes, ketones, esters, anhydrides, sulfonates, phosphonates, chelates, phenates, crown ethers, carboxylic acids, amides, acetyl acetonates and mixtures thereof.

8. The method described in claim 3, wherein the manganese-containing compound comprises about 1 to about 50 mgMn/liter of the fuel.

9. The method described in claim 6, wherein the organometallic compound comprises methylcyclopentadienyl manganese tricarbonyl.

10. The method described in claim 3, wherein the manganese-containing compound is selected from the following group: cyclopentadienyl manganese tricarbonyl, methylcyclopentadienyl manganese tricarbonyl, dimethylcyclopentadienyl manganese tricarbonyl, trimethylcyclopentadienyl

manganese tricarbonyl, tetramethylcyclopentadienyl manganese tricarbonyl, pentamethylcyclopentadienyl manganese tricarbonyl, ethylcyclopentadienyl manganese tricarbonyl, diethylcyclopentadienyl manganese tricarbonyl, propylcyclopentadienyl manganese tricarbonyl, isopropylcyclopentadienyl manganese tricarbonyl, tert-butylcyclopentadienyl manganese tricarbonyl, octylcyclopentadienyl manganese tricarbonyl, dodecylcyclopentadienyl manganese tricarbonyl, ethylmethylcyclopentadienyl manganese tricarbonyl, indenyl manganese tricarbonyl, and the like, including mixtures of two or more such compounds.

11. A method as described in claim 1, wherein the fuel contains less than about 30 ppm of sulfur.

12. The method as described in claim 1, wherein the spark ignited internal combustion engine comprises a fuel injection system selected from the group consisting of the following: port fuel injection system, multi point injection system, and direct injection gasoline system.

13. The method as described in claim 1, wherein the fuel comprises regular, unleaded gasoline.

14. The method as described in claim 1, wherein the engine comprises six or more cylinders.

15. A method of reducing cold start emissions from spark-ignited internal combustion engines that experience combustion chamber deposits comprising the steps of:

supplying a fuel comprising an additive that includes a metal-containing compound to a spark ignited internal combustion engine;

wherein the metal-containing compound is supplied in an amount effective to reduce cold start emissions.

16. A method as described in claim 15, wherein the metal-containing compound comprises a metal selected from the group consisting of manganese, platinum, palladium, rhodium, iron, cerium, copper, nickel, silver, cobalt, and molybdenum, and mixtures thereof.

17. A method as described in claim 16, wherein the metal-containing compound comprises a manganese compound.

18. The method described in claim 17, wherein the manganese-containing compound is an inorganic manganese compound.

19. The method described in claim 18, wherein the inorganic manganese compound is selected from the group consisting of fluorides, chlorides, bromides, iodides, oxides, nitrates, sulfates, phosphates, nitrides, hydrides, hydroxides carbonates and mixtures thereof.

20. The method described in claim 17, wherein the manganese-containing compound is an organometallic compound.

21. The method described in claim 20, wherein the organometallic compound is selected from the group consisting of alcohols, aldehydes, ketones, esters, anhydrides, sulfonates, phosphonates, chelates, phenates, crown ethers, carboxylic acids, amides, acetyl acetonates and mixtures thereof.

22. The method described in claim 17, wherein the manganese-containing compound comprises about 1 to about 50 mgMn/liter of the fuel.

23. The method described in claim 20, wherein the organometallic compound comprises methylcyclopentadienyl manganese tricarbonyl.

24. The method described in claim 17, wherein the manganese-containing compound is selected from the following group: cyclopentadienyl manganese tricarbonyl, methylcyclopentadienyl manganese tricarbonyl, dimethylcyclopentadienyl manganese tricarbonyl, trimethylcyclopentadienyl manganese tricarbonyl, tetramethylcyclopentadienyl manganese tricarbonyl, pentamethylcyclopentadienyl manganese tricarbonyl, ethylcyclopentadienyl manganese tricarbonyl, diethylcyclopentadienyl manganese tricarbonyl, propylcyclopentadienyl manganese tricarbonyl, isopropylcyclopentadienyl

manganese tricarbonyl, tert-butylcyclopentadienyl manganese tricarbonyl, octylcyclopentadienyl manganese tricarbonyl, dodecylcyclopentadienyl manganese tricarbonyl, ethylmethylcyclopentadienyl manganese tricarbonyl, indenyl manganese tricarbonyl, and the like, including mixtures of two or more such compounds.

25. A method as described in claim 15, where the fuel contains less than about 30 ppm of sulfur.

26. The method as described in claim 15, wherein the spark ignited internal combustion engine comprises a fuel injection system selected from the group consisting of the following: carbureted systems, port fuel injection system, multi point injection system, and direct injection gasoline system.

27. The method as described in claim 15, wherein the fuel comprises regular, unleaded gasoline.

28. The method as described in claim 15, wherein the engine comprises six or more cylinders.